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THE STATUS, CONSERVATION AND MANAGEMENT OF SEA TURTLE RESOURCE IN KHANH HOA PROVINCE, VIETNAM

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ABSTRACT

Based on previous studies and the data in 1998-2001 in Khanh Hoa Sea, this report indicated that sea turtle in this area has been significantly decreased in number of individual. The increasing consumed numbers of sea turtle yearly were mainly belong to the family *Cheloniidae* (hawksbill & green turtles). Due to over exploitation for food, medicines and handicrafts and environmental pollution, many species of sea turtle have been in a nearly exhaustion.

Making a strategy for management, and conservation of sea turtle resource in the most effective way has been suggested.

INTRODUCTION

Vietnam is coastal country, and sea is playing as very important role in human life. Exploitation and using marine resource in suitable way should be priority, and long -time strategy in economic and social development. Beside seafood resource, Vietnamese sea has very huge of other resource from marine mammals as sea turtle. Sea turtle is animal that has back bone developed to the carapace. They are one of the wild and archaeological animals. They have presented from over 1000 years before with world wide distribution, long life and high mature. Sea turtle is migrated species, they can migrate several thousand kilometers, so in their life cycle, they can live in different geological areas in the world. Their main food is macro algae, but some time also fish, shrimps and crabs.

Sea turtle in Vietnam as well as Khanh Hoa have been decreasing in numbers of individual. Many species have been nearly extinct because of over exploitation for food, medicines and handicrafts. Their habitat, laying and hatching areas have been destroyed by human. Another reason that making decrease of sea turtle is oceanic pollution and over exploitation of seafood resource which leads decreasing of their natural food.

In Vietnam, there are limited of the studies about sea turtle, and mainly by foreign scientists. Some sea turtle studies in period before 1945 including: Le Quy Don (1777: 320) (in "Van Dai Loai Ngu", vol. 9) mentioned about 1 species of hawksbill turtle in Quang yen province (North Vietnam). Trinh Hoai Duc (1863: 74) (in "Gia Dinh Thong Chi") mentioned about 2 species of hawksbill turtle. That are the first references in Vietnam. After that, some foreign authors such as Bocourt (1886), Mocquard (1897, 1907a, 1907b), Morice (1874, 1897), Tirant (1885) also showed that there were some reptiles in Indo China, included sea turtle. P. Chevey (1926 1-4) published about the exploitation of sea turtle in Hoang Sa Archipelago. Also, when studied on sea turtle population in Hoang Sa Archipelago, R. Bourret (1941 123-132) described 4 species of sea turtle. F.le Poulain summarized about sea turtle in not only numbers of species in Thailand Gulf, but also morphology characteristics, methods for culture and important value of their carapace.

The references in period after 1975 including: Dao Van Tien (1976) gave a list of Vietnamese sea turtle, included 5 species. Nguyen Khac Huong (1978 275-287) cited that there were some species of sea turtle were found in Vietnamese sea. In this study, the author mentioned very details about morphology characteristics for identification, but there were some synonyms and only mentioned about 4 species. Nguyen Huu Phung (1992) in the Vietnamese Red Book showed that there were 4 species of sea turtle need to be put in a list of protected animals. Nguyen Van Sang and Ho Thu Cuc (1996) gave a species list of Vietnamese reptiles and amphibians, which mentioned about 4 species of Vietnamese sea turtle. Le Xuan Ai (1998: 28-35) suggested a conservative plan for Vietnamese sea turtle in Con Dao Island. Recently, Nguyen Huu Phung (2000, vol. X: 242-245) in a publication about the status of Vietnamese sea turtle, he gave the data of 5 sea turtle species in Vietnamese sea with yield, laying areas..., also some main suggestions for protecting sea turtle resource in Vietnam.

MATERIALS AND METHODS

Previous data was using to compare and summarize such as:

- Identification of Vietnamese sea turtle (Dao Van Tien, 1976)
- Some sea turtle species in Vietnamese sea (Nguyen Khac Huong, 1978)
- FAO species Catalogue, vol.11 – Sea turtles of the world
- Transboundary Diagnostic Analysis for the South China Sea
- Proceedings of the first ASIAN Symposium Workshop in Marine turtle Conservation (Manila, Philippine, 1993)
- Some other references.

We used methods, scientific concepts and key characteristics following guide book (FAO). This report is summarizing of previous data and our data in 2000-2001, which based on biological investigation, interview fisherman and identification of specimens in Museum of Nhatrang Institute of Oceanography and in the field.

RESULTS AND DISCUSSION

The status and the trend of sea turtle in Khanh Hoa

Khanh Hoa coast is 350 kilometers in length with many islands and some bays (Van Phong -Ben Goi, Nha Trang and Cam Ranh), lagoons (Nha Phu, Thuy Trieu), so it is biodiversity area. Previously, scientists determined that there were 2 family of sea turtle, Leatherback turtle and Green turtle. The family Leatherback turtle has characteristics: the present of many convex notopterias on very hard carapace and there is only one species *Dermochelys coriacea*. The family Green turtle has very hard carapace and there are 4 identified species: Olive ridley turtle (*Lepidochelys olivacea*), Hawksbill turtle (*Eretmochelys imbricata*), Loggerhead turtle (*Caretta caretta*) and Green turtle (*Chelonia mydas*) (Tab. 1).

Before 1975, there was presence of 5 sea turtle species in Khanh Hoa, which were caught by fisher man. Up to 2001, according to the result from our interview, the numbers of sea turtle have decreased significantly. Especially, leatherback turtle *Dermochelys coriacea* couldn't be found in Khanh Hoa Sea and Truong Sa Archipelago after 30 years and other areas. Only 1 individual was observed in Thua Thien-Hue

(2000) and the other one in Quang Ngai (2001). In our idea, this species may be damaged and nearly extinct. In 4 species belong family *Chelonidae*, the most ubiquitous is Green turtle *Chelonia mydas*, next one is Hawksbill turtle *Eretmochelys imbricata* and Loggerhead turtle *Caretta caretta*. But species Olive ridley turtle *Lepidochelys olivacea* has been nearly extinct, very rare and the last individual can be observed in 1997.

Table 1: Vietnamese sea turtle, distribution and their status

Scientific name	Vietnamese name	Distribution	Status
<i>Dermochelys coracea</i>	Rùa da	Hai Phong, Khanh Hoa, Con Dao, Kien Giang	Very rare
<i>Lepidochelys olivacea</i>	Ŕoài moài dđũa(Nđu)	From North to South Vietnam, Thailand guft (mainly in Nha Trang, Truong Sa, Phan Thiet, Con Dao)	Very rare
<i>Eretmochelys imbricata</i>	Ŕoài moài	Tonkin guft, Central Vietnam, Hoang Sa, Truong Sa	Rare
<i>Caretta caretta</i>	Quaũn ãoàng	Khanh Hoa, Truong Sa, Con Dao	Rare
<i>Chelonia mydas</i>	Vịch (Rũa xanh)	Tonkin Guft, Central and South Vietnam, Truong Sa	Ubiquitous

Damaged habitat and reasons of the decreasing of sea turtle resource in Khanh Hoa

Khanh Hoa is one of the seven provinces has high fish production in Vietnam (7/26), with average production is 54.900 tones/year and it located near by important fishing lands (such as South of Central Vietnam, East of South Vietnam, South China Sea...). Until the end of 2001, there are 3400 fishing machine boats (the power 105.028 CV) in Khanh Hoa, and 500 others one from other provinces (Quang Nam, Quang Ngai, Binh Dinh, Phu Yen) also have come to Khanh Hoa fishing lands for fish exploitation. General production of fishing has increased but the productivity has decreased, so this exploitation is quite unstable.

Many kinds of seafood exploitation (such as trawl, gill net, purse seine light...) have been well developed, caused strong effects to migration, finding food, laying of sea turtle. It is important that the used net is too long (10-15 km), over limitation of managers and high density of fishing boats in certain fishing area have made many sea turtle caught. High intensity in purse seine light method made sea turtle was afraid, didn't come to the shore for laying. Therefore, the numbers of sea turtle egg were decreased significantly while the numbers of fishing boats and intensity of light increased (example, in the laying areas in North of Hon Tre Island and Bai Dai, Cam Ranh).

Even though it still has many other factors but from these evidences, main factors may effect to sea turtle laying are high density of fishing boat and high intensity of light. The developing plan for marine aquaculture in lack of management, for example shrimp culture in the sand area leads laying place for sea turtle was been narrowed. Tourist development in some island of Khanh Hoa also affected to sea turtle laying.

Another important reason affects to species composition and number of sea turtle population is over commercial exploitation from fisher man. According to Duc & Broad

(1993), about 300-2000 Hawksbill turtle were sold in Kien Giang, Con Dao and Nha Trang. Every year, numbers of sea turtle are traded (mainly belong to family *Cheloniidae*, into 2 species Hawksbill and Green turtle have increasing. In many souvenir shops in Nha Trang market, handicrafts from sea turtle without any commitment or lease and there is no education for fisher man (shouldn't kill sea turtle).

Marine pollution also has strong effect to sea turtle life, the disappearance of leather turtle in Khanh Hoa may be an evidence of ecological unbalance because this species is bio-indicator organism for environment, while normally, fisher man don't kill them or use their products for other purposes.

The technical development and increasing of population in Vietnam and Khanh Hoa recently have caused some negative effects, such as the exhaustion of natural resource, environmental pollution, limited activity of living basic compounds...And human is one of main factors caused problems for marine resource, for example sea turtle (become poor species composition, transformation and nearly extinction). It is an alert from nature about protecting environment and natural resource.

Table 2: Exploitation of Hawksbill turtle in Vietnam, 1993 (Duc & Broad, 1993).

Site studied	Captive-rearing for meat and shell	Capture of adults for meat and shell	Traded shell (ky can be obtained form 1 adult)	Traded stuffed turtle
Kien Giang (Total production in 1993: 308 inds.	173	56	20	59
Con Dao (Archipelago 1970s to 1985)	50-100 killed/year			
Nhatrang (2000 carapace pieces traded annually			150-200/year	200-300/year

Studies and orientation for conservation of sea turtle resource in Khanh Hoa

Although sea turtle has limit in a number of species, this marine animal has scientific value as precious, high biological value animal from the sea. Recently, sea turtle has retrogressed and be put in Red Book (level E). But because of lack of human protection, high commercial value for their products, over exploitation egg and meat for food, sea turtle resource has exhausted and go into extinct in some species. Therefore, it is necessary to have exhausted and systematic strategy for protecting sea turtle resource. The study about investigation, identification and describing sea turtle species and their status is very important scientific background in order to find the best orientation and recovery this resource. It needs to have well-cooperation between fisher man, managers and scientists. For this purpose, data collection, update, standard methods and training course should be paid attention. Because growth of sea turtle is slow, high mortality in larvae stage, wild distribution, long life and depending on coastal sensitive ecological system (which is easy to be damaged), so study about biological characteristics of sea turtle needs to be precise in determining scale and flexible of sea turtle stock, and analyze which factors or reasons may effect to sea turtle resource. Furthermore, it needs to have international cooperative study because sea turtle is not only national but also international natural resource. Well-cooperation of many countries in the world as well as

attending on the international coordination about conservation of sea turtle is also necessary.

Some subjects in the study and conservation sea turtle program:

- Study and drive
- Management for stable development of sea turtle
- Establish conservative ability
- Study and manage conservative areas
- Human realize about protecting natural resource
- Information and cooperation
- Education of human awareness about natural conservation
- Building international and regional organizations to evaluate the status of sea turtle in different regions.
- Building sea turtle conservative bank

CONCLUSION

- Sea turtle is high biological species of marine animals with high commercial and precious value. Furthermore, they have world wide distribution, they are international marine resource. It is necessary to well cooperative management and conservation between countries.
- Sea turtle in Khanh Hoa has decreased recently in number of individual, the strategy for management needs to be established in this region.
- Suggest to functional organizations should give the rule for exploitation and trade of this species in any way.
- Need to have exhaustive and systematic solution for determination, described and status of sea turtle in our region, so this study in Khanh Hoa as well as in region is important for orientation, implementation of conservation and repopulation of this marine resource.